IN THE CLAIMS:

Claims 1-32 (canceled)

Claim 33 (currently amended) An ultrasonic longitudinal-torsional tissue dissection system ~~comprising an~~ having only a single source of vibration consisting of only a single electro-mechanical transducer for receiving alternating electrical current and voltage from an ultrasonic generator, said transducer having a point of mechanical contact with a resonator, said transducer producing at said point of contact only a single type of vibration selected from the group consisting of longitudinal vibration and torsional vibration, said transducer immediately upstream from said point of mechanical contact having only said single type of vibration, said resonator being mechanically joined to a tip shaped for cutting biological tissue, and at least a portion of said resonator having an inhomogeneous cross section which at said resonator converts the single type of vibration into a combined longitudinal-torsional vibration upstream from said tip for imparting the longitudinal-torsional vibration to said tip.

Claim 34 (previously presented) A system of claim 33 where said inhomogeneous portion comprises a section having a rectangular cross section having the shape of a helical spiral.

Claim 35 (previously presented) A system of claim 33 where said inhomogeneous portion comprises a twisted flat bar.

Claim 36 (currently amended) A system of claim 35 where said twisted flat bar is joined to an untwisted bar having a larger cross sectional area than said twisted bar ~~to form a stepped half-wavelength resonator~~.

Claim 37 (previously presented) A system of claim 36 where said untwisted bar is connected to said transducer.

Claim 38 (previously presented) A system of claim 33 where said inhomogeneous portion comprises a grooved round bar.

Claim 39 (canceled)

Claim 40 (previously presented) A system of claim 33 where said inhomogeneous portion comprises a section having a density that varies in a helical manner throughout said portion.

Claim 41 (previously presented) A system of claim 33 where said inhomogeneous portion comprises a section having an elastic modulus and density that vary in a helical manner throughout said portion.

Claim 42 (previously presented) A system of claim 33 where said tip has a cutting edge.

Claim 43 (previously presented) A system of claim 33 where a hollow longitudinal passageway extends completely through said tip and into said resonator.

Claim 44 (previously presented) A system of claim 43 where a source of irrigation is connected to said passageway.

Claim 45 (previously presented) A system of claim 43 where a vacuum source is connected to said passageway.

Claim 46 (previously presented) A system of claim 43 where a slot is in said resonator communicating with said passageway, and an external flow line in flow communication with said slot.

Claim 47 (previously presented) A system of claim 33 where said single type of vibration is longitudinal.

Claim 48 (previously presented) A system of claim 33 where said single type of vibration is torsional.

Claim 49 (previously presented) A system of claim 33 where the ratio of longitudinal-torsional vibration at said tip to the single type of vibration at said point of mechanical contact of said transducer with said resonator is in the range of 1 to 100.

Claim 50 (previously presented) A system of claim 33 where said inhomogeneous portion is tapered from a larger cross nearer to said transducer to a smaller cross section nearer to said tip.